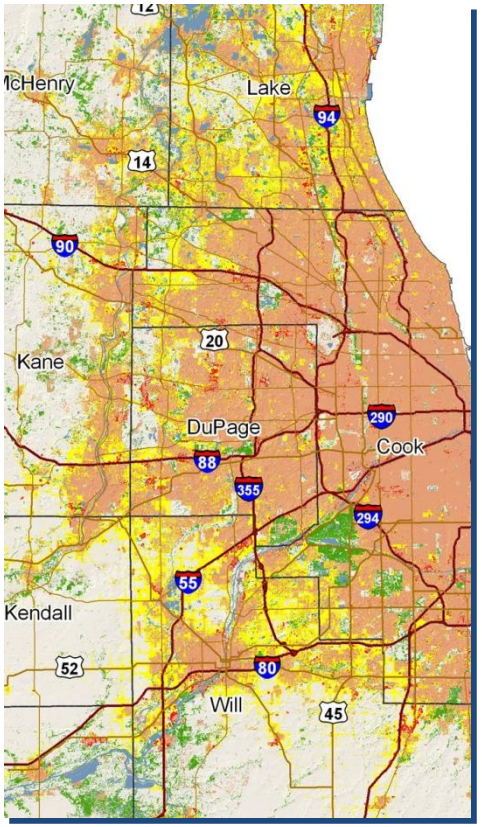
The Lake Michigan Watershed Planning Support System

- An On-line Planning Tool to Assess Regional and Local Development Policy in the Chicago Metro Area

- http://www.leam.uiuc.edu/lmwpss



Introduction

- Model developed by the **L**and Use **E**volution and Impact **A**ssessment **M**odel **Lab** at UIUC

- LEAM can dynamically forecast regional land use change and can also assess some of the likely environmental impacts of such change

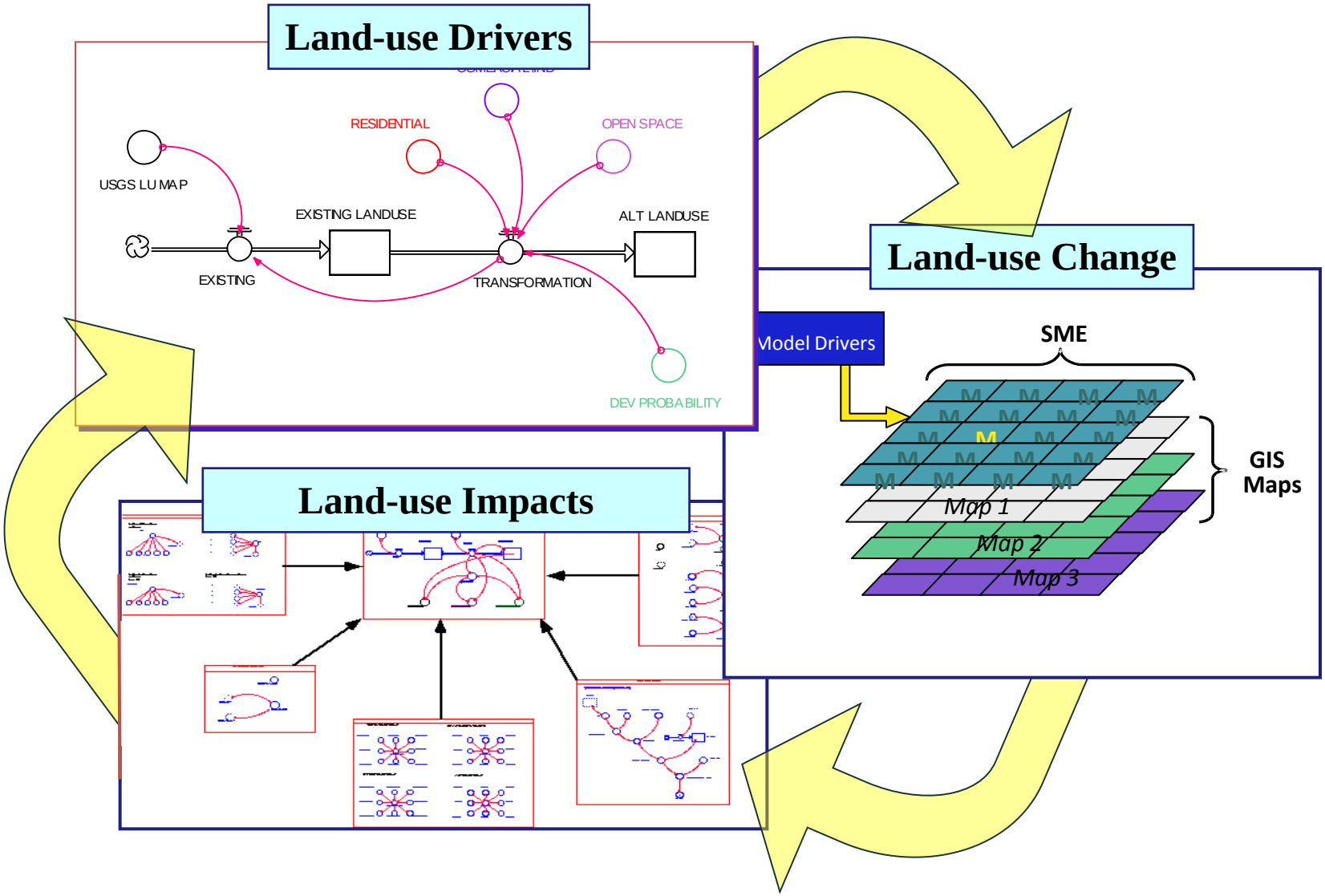
- Easy to navigate – uses Google maps as base

Partnerships

- The Lake Michigan Watershed Planning Support System project is a collaboration between:
  - The Lake Michigan Watershed Ecosystem Partnership (established by the Alliance for the Great Lakes)
  - The LEAM Lab at UIUC (Profs. Brian Deal and Varki George, Dept. of Urban and Regional Planning)
  - The Illinois-Indiana Sea Grant College Program

- Funded by the Cooperative Institute for Coastal and Estuarine Environmental Technology (NOAA)

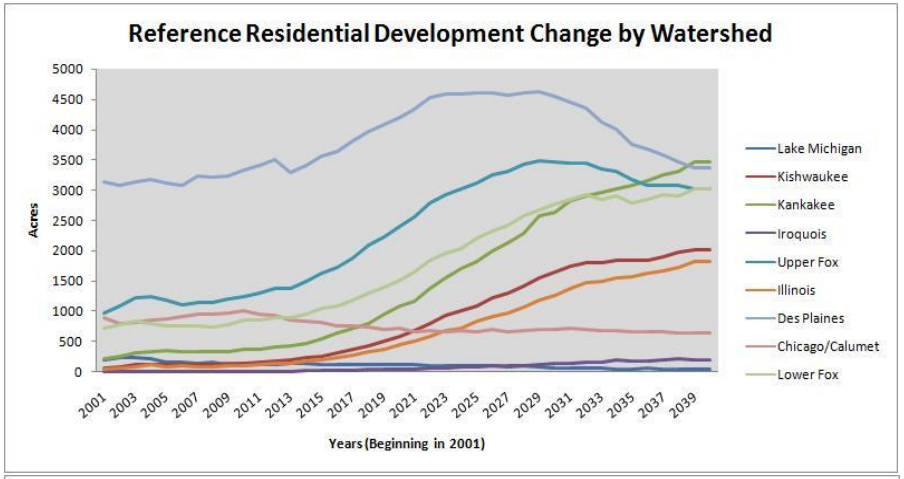
LEAM Model Framework

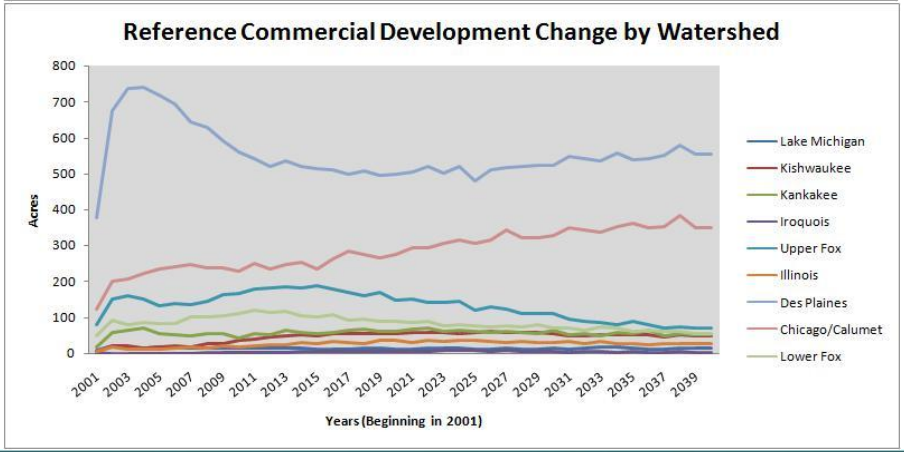


Regional Land Use Change

- LEAM projects regional land use change out to 2040
  - Grids region (30m x 30m cells)
  - Simulates interaction between sub-models (population, transportation, economic, etc.) to predict probability of an adjacent grid cell changing its use

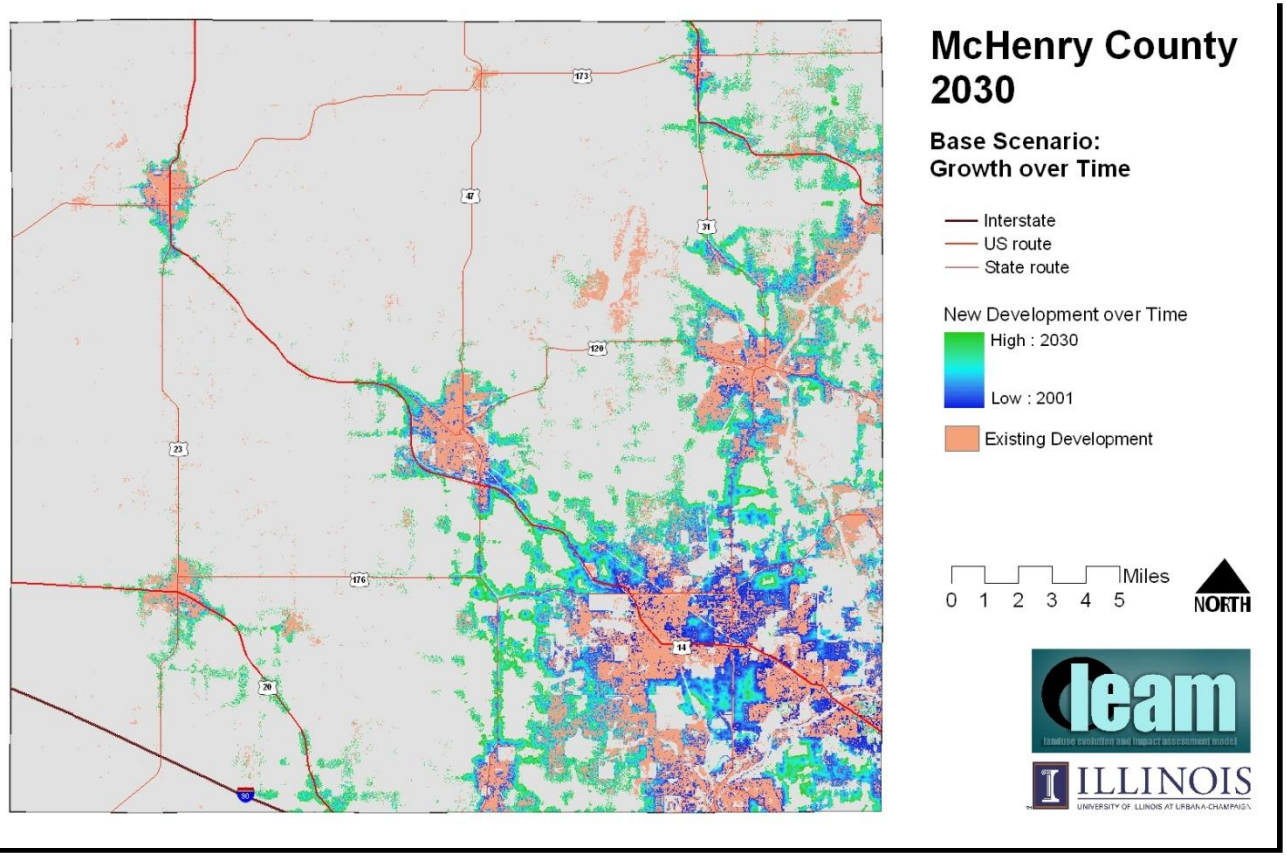
- LEAM spatially forecasts:
  1. Residential,
  2. Commercial/industrial, and
  3. Open space (agriculture and forestry) land cover





Viewing Change Over Time

- LEAM simulates annual growth
- When viewed as a dynamic map or a graph, the future is described in a much richer fashion

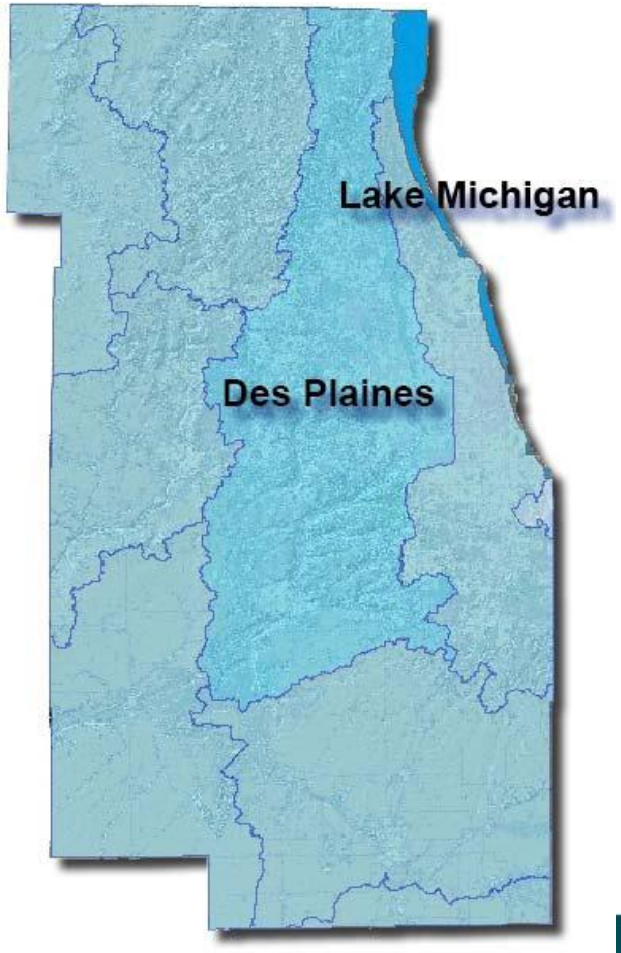


Implications of Land-use Change

- More detailed comparisons among land-use futures can be made -- What are the environmental, social, and economic consequences? How do they differ?
- Development probabilities indicate which areas are under the most pressure for development
- LEAM data on land-use change can be processed for input into other available models
  - Water quality
  - Water quantity
  - Transportation models
  - Air quality models
  - Habitat fragmentation models

Watershed Analyses

- This project assesses some environmental impacts, so uses **watersheds** as units of analysis
  - HUC-8 level (with sub-watersheds analyzed down to HUC-10 level)
  - Lake Michigan and Des Plaines Watersheds
- Political boundaries are also GIS data layers (covers Cook, Lake, DuPage, Will, McHenry, Grundy, Kane, Kendall and Kankakee counties)



Regional Policy Scenarios

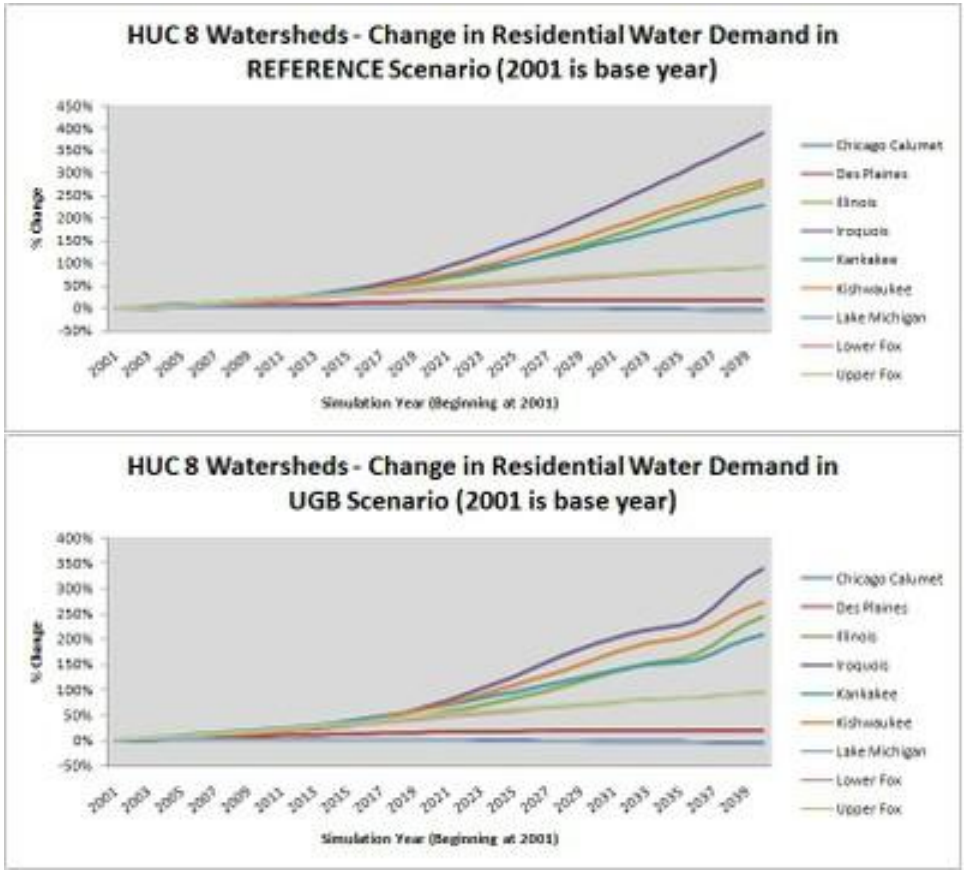
- Land use projected under current policies is the "business as usual" reference scenario
- Alternative regional scenarios also modeled:
  - Agricultural Preservation Districts (NCRS)
  - Conservation Easement Districts (IDNR)
  - Transfer of Development Credits (into "soft" sites)
  - Urban Growth Boundary
  - 40-acre zoning (quarter-quarter section agricultural preservation zoning)
  - Green Infrastructure – IDNR & LEAM (no growth) and Chicago Wilderness (less growth) "hubs and corridors"

Assessing Effects of Land-Use Change on Natural Resources

- Model can project how future land-use change under various scenarios affects coastal and other natural resources
- Two types of analysis:
  - Simple overlay analysis (overlays LEAM simulation with spatial resource layers)
  - Development Stress Analysis
    - Identify resource areas with the highest probability of development
    - Assess timing of stress
    - Compare changes in stress from scenario to scenario

Stress Analyses: Water Demand

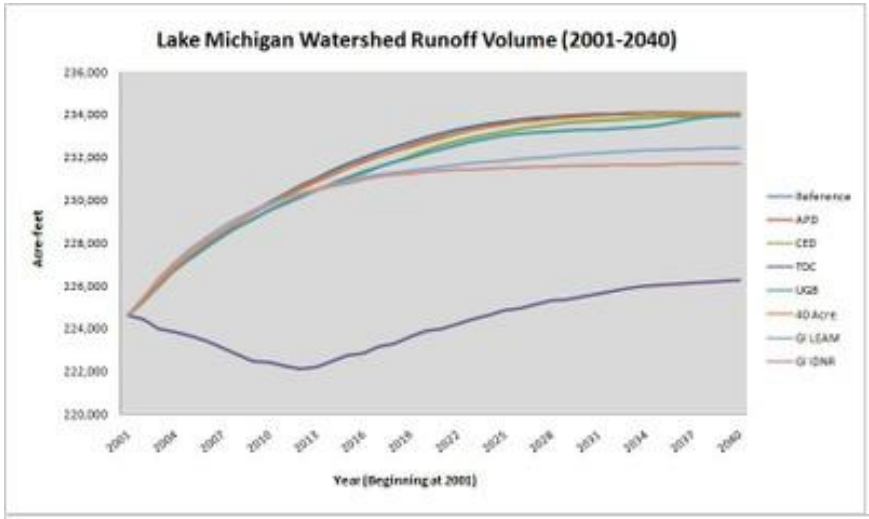
- Model can compare the relative water demands of different regional growth policies
- Analyses based on USGS's five-year water use estimates (by water user and county) re-aggregated by LEAM to HUC-8 watershed level

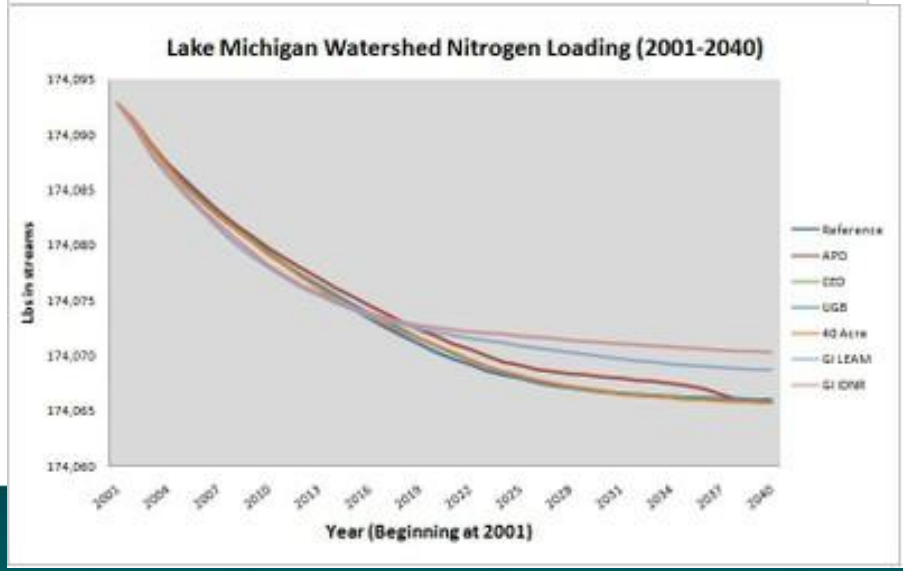


Stress Analyses: L-THIA

- L-THIA = **L**ong-**T**erm **H**ydrologic **I**mpact **A**ssessment model (Purdue University)

- Can estimate stormwater runoff volumes and nutrient loadings to waterways based on soil characteristics and land use change under the different regional growth scenarios.



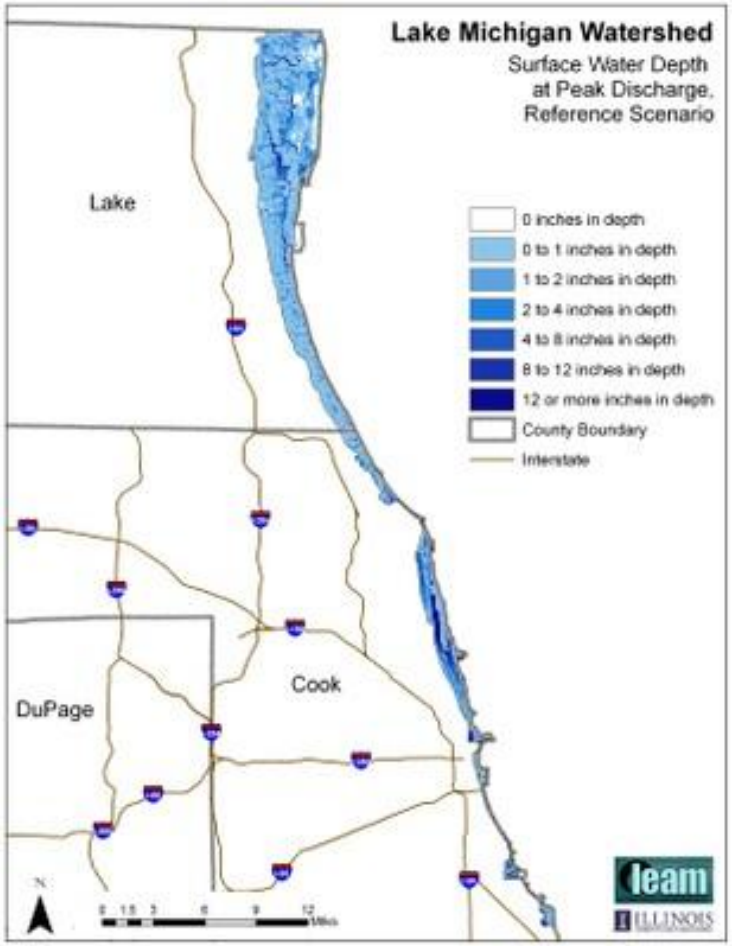


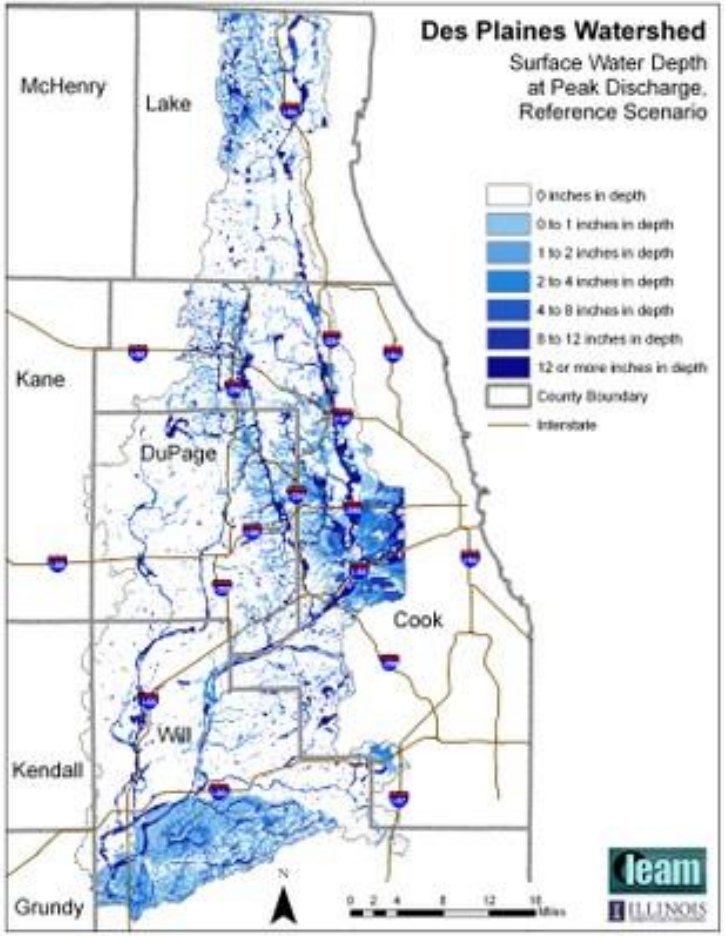
Stress analyses: Hydrology

- Flood risks and severity generally increase with urbanization – with fewer permeable surfaces and less surface roughness with paving and less vegetation, more runoff is discharged directly and indirectly to waterways

- LEAM dynamically models the impacts of a 24-hour/100-year flood under the different regional development scenarios for each HUC-10 watershed

Stress Analyses: Hydrology (con't)





Information System of Plans

- LEAM is hoping to develop a database of existing plans affecting development within the Lake Michigan and Des Plaines watersheds
- These plans include county plans, watershed plans, comprehensive plans, transportation plans, land use plans, environment/resource plans, etc.
- Stakeholders can use ISoP to identify policy gaps, overlaps, etc. when developing management and planning strategies for watersheds in the region.

Using LEAM

- Access LEAM at **http://www.leam.uiuc.edu/lmwpss**

- **You will see the following homepage**

Welcome!

Chicago Regional Watershed Planning Support System

Site Map Accessibility Contact

Search Site Search

only in current section

Home | Watershed Analyses | Regional Policy Scenarios | Regional Impact Assessments | ISoP | FAQ

wepplan Log out

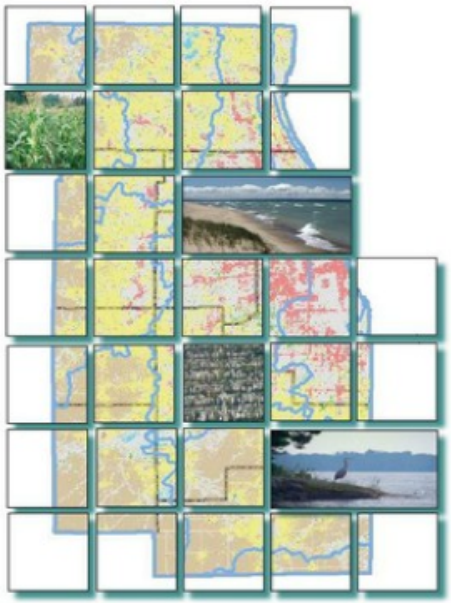
You are here: Home

Contents | View | Sharing

State: Public

Welcome!

by admin — last modified May 30, 2009 02:43 PM



This interactive website is a collaborative effort between the Land Use Evolution and Impact Assessment Model (LEAM) Laboratory at the University of Illinois at Urbana-Champaign, the Illinois-Indiana Sea-Grant Program at the University of Illinois at Chicago, and the Lake Michigan Watershed Ecosystem Partnership (LMWEP) organized and administered by the Alliance for the Great Lakes. The purpose of this project is to develop and apply dynamic spatial simulation technologies and hydrological modeling to create a coastal and watershed planning support system for Northeastern Illinois. LMWEP will use this web-based model to: 1) assess the future growth of the Chicago metro area and how this projected growth will affect the region's water resources, 2) consider the future policies and actions that will be needed to manage and protect the region's coastal and water resources, and 3) deliver this knowledge so that it is understandable, usable, and widely available to local officials, nonprofit organizations and other stakeholders concerned with environmental protection and land use planning in the Chicago region. Funding for this project is provided by the Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET), a partnership of the National Oceanic and Atmospheric Administration and the University of New Hampshire .

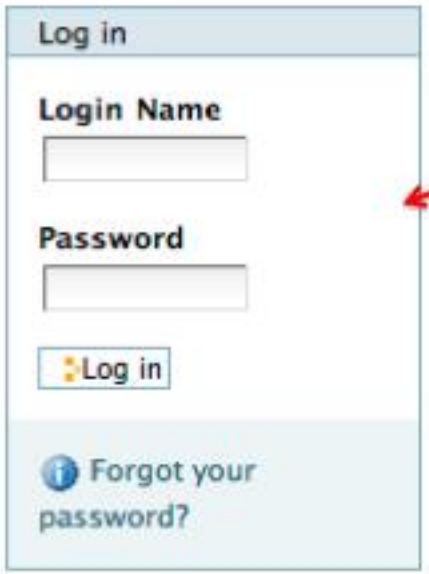
Using This Site

Click the icon  **to open a pdf tutorial for using this site.**

The information in this site is organized by tabs found at the top of the page.

- To open a tab, click it. The page is displayed and a navigation menu appears on the left hand side of the screen.
- To view the contents of a folder, click on the label in the navigation menu. The item is displayed along with folder contents.
- To view layers in a map, check the box next to that layer's name.
- The order in which the layers are checked is the order in which the layers are displayed; the last layer checked will be on top.

Login



Enter “**wepplan”** for “login” and “**leamlabplan”** for “password.”

Basic Navigation

There are several ways to navigate this site

- Upper tabs

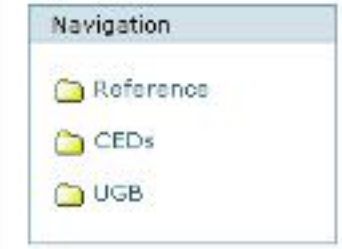
Provide highest-level separation of main content areas

- Breadcrumbs'

Display navigational history, provide links to previously-viewed pages

Navigation

- Navigation Portlet

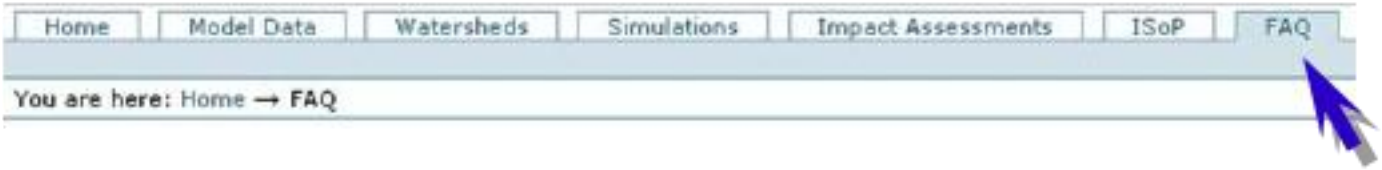


Selectable listing of all files and folders within a particular tab.

Getting Help

- Should you have any questions or wish to give feedback on the site or its contents, there are several options

1. View the FAQ tab for general background information.



2. Email the site administrator using the 'Contact' link at the top of the page.

3. Submit a content-specific question or comment using the 'Add Comment' button beneath the main content window.

Viewing Maps

- Maps can be viewed from two perspectives
  - 'Watershed'
    - All information and analyses are broken down by individual watershed
  - And 'Regional'
    - Regional simulation results are provided

Entering a SimView folder will create many changes to the look and feel of the site…

SimView

The navigation portlet will display a check-list of data layers ('SimMaps'):

SimView

The main window will show a GoogleMaps view of the study area.

SimView

The area below the GoogleMap window will display details and comments about the map.

Details

Reference Scenario

Development occurs in the Reference scenario unimpeded by policy interventions other than those already in place at the beginning of the analysis. Therefore, this scenario represents a baseline for potential future development patterns in the region to the year 2040. This 'business as usual' scenario will be used for comparison to each policy or investment simulation tested.

Link to Scenario Downloads

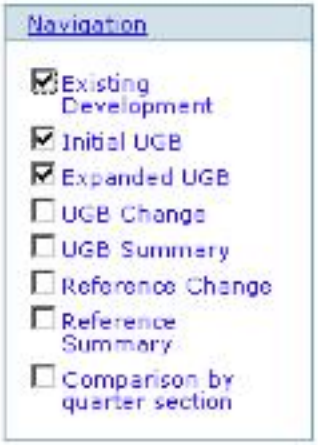
The following sections describe the land use, water quality and demand, and development stress implications of the continuation of current trends and policies.

SimView

Selecting a Map

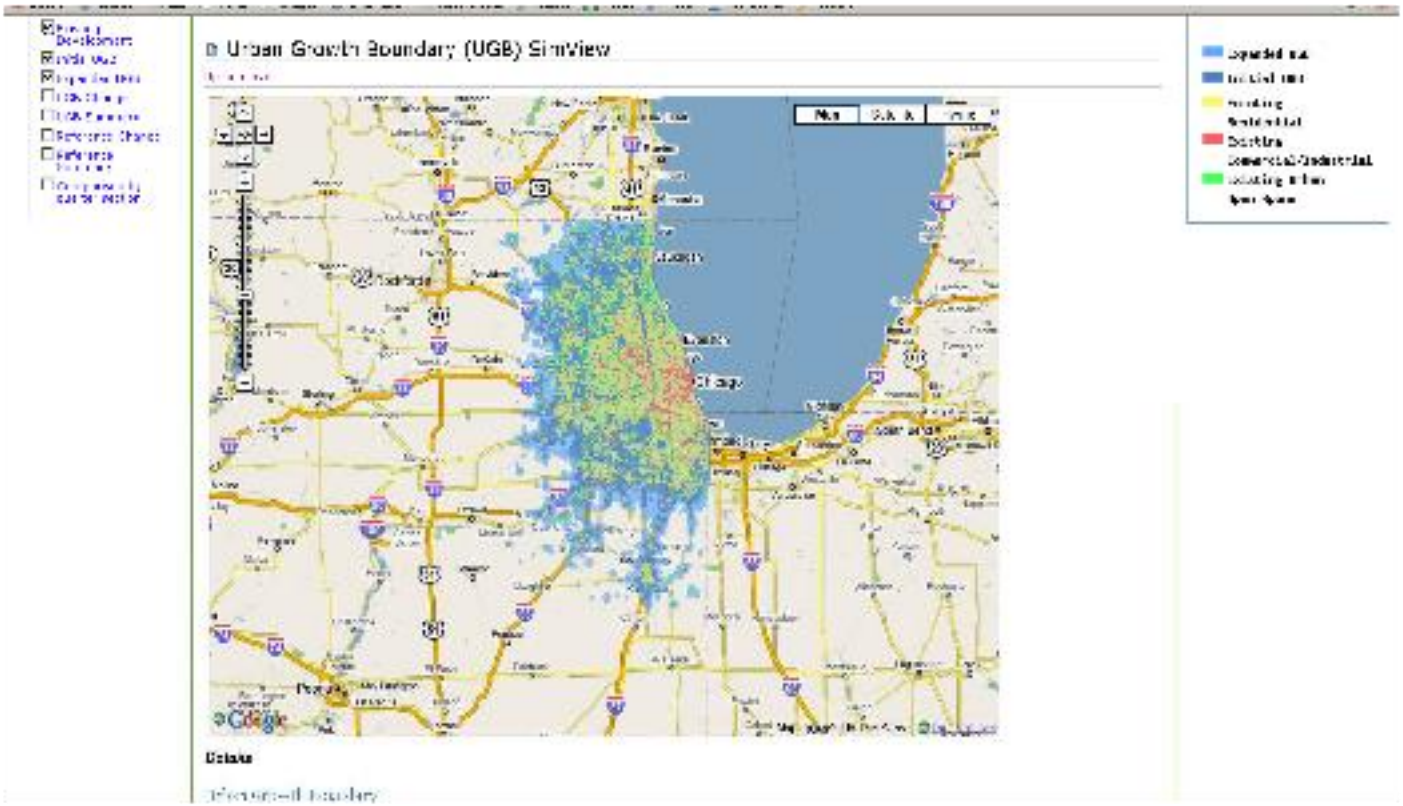
To select a map, click the associated checkbox in the navigation portlet

Selecting a layer:



The order in which you select the layers determines the order in which they are displayed: the last layer selected will be displayed on top.

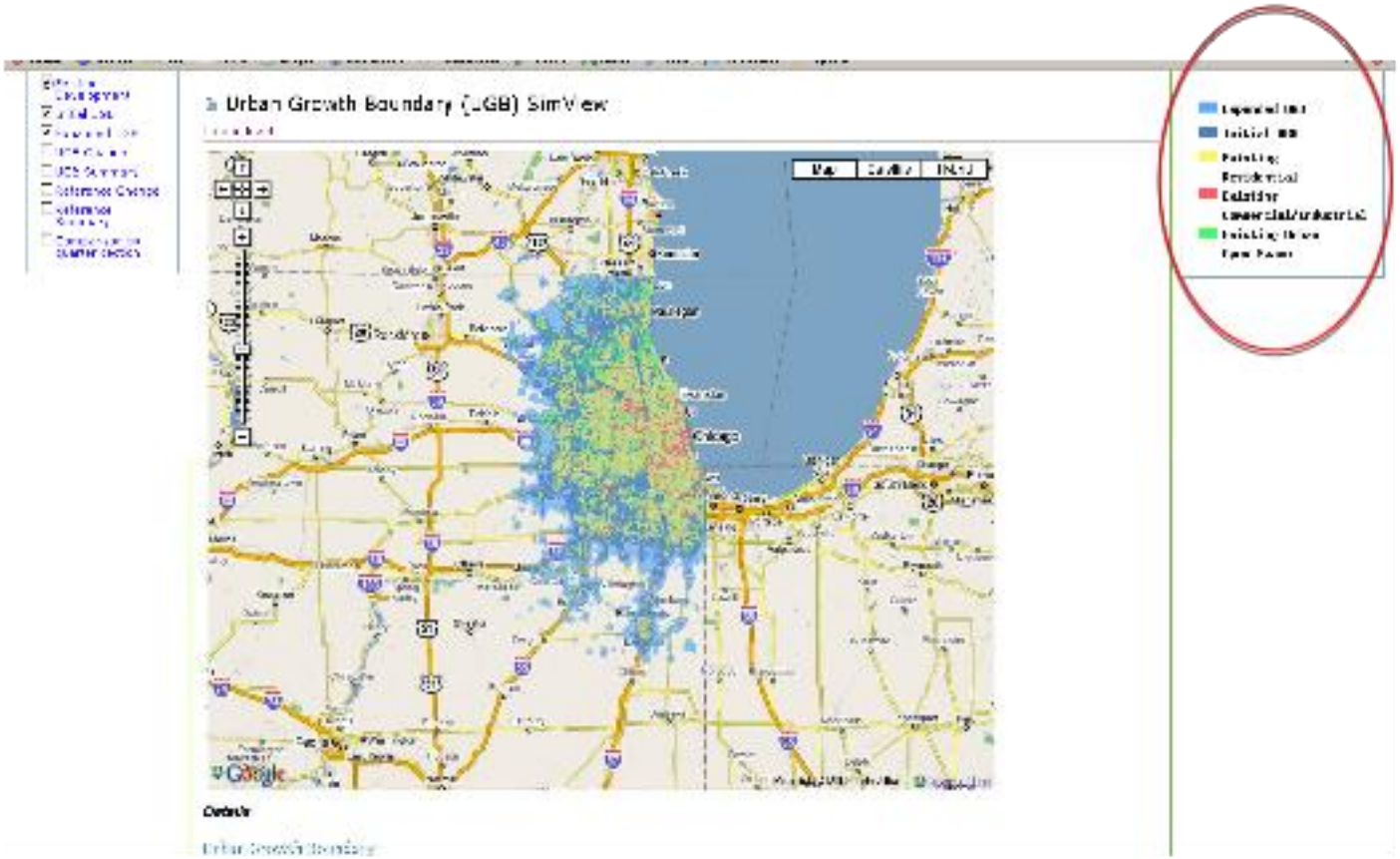
SimView



Maps are displayed as layers within GoogleMaps

Maps layers are displayed in the order they are selected

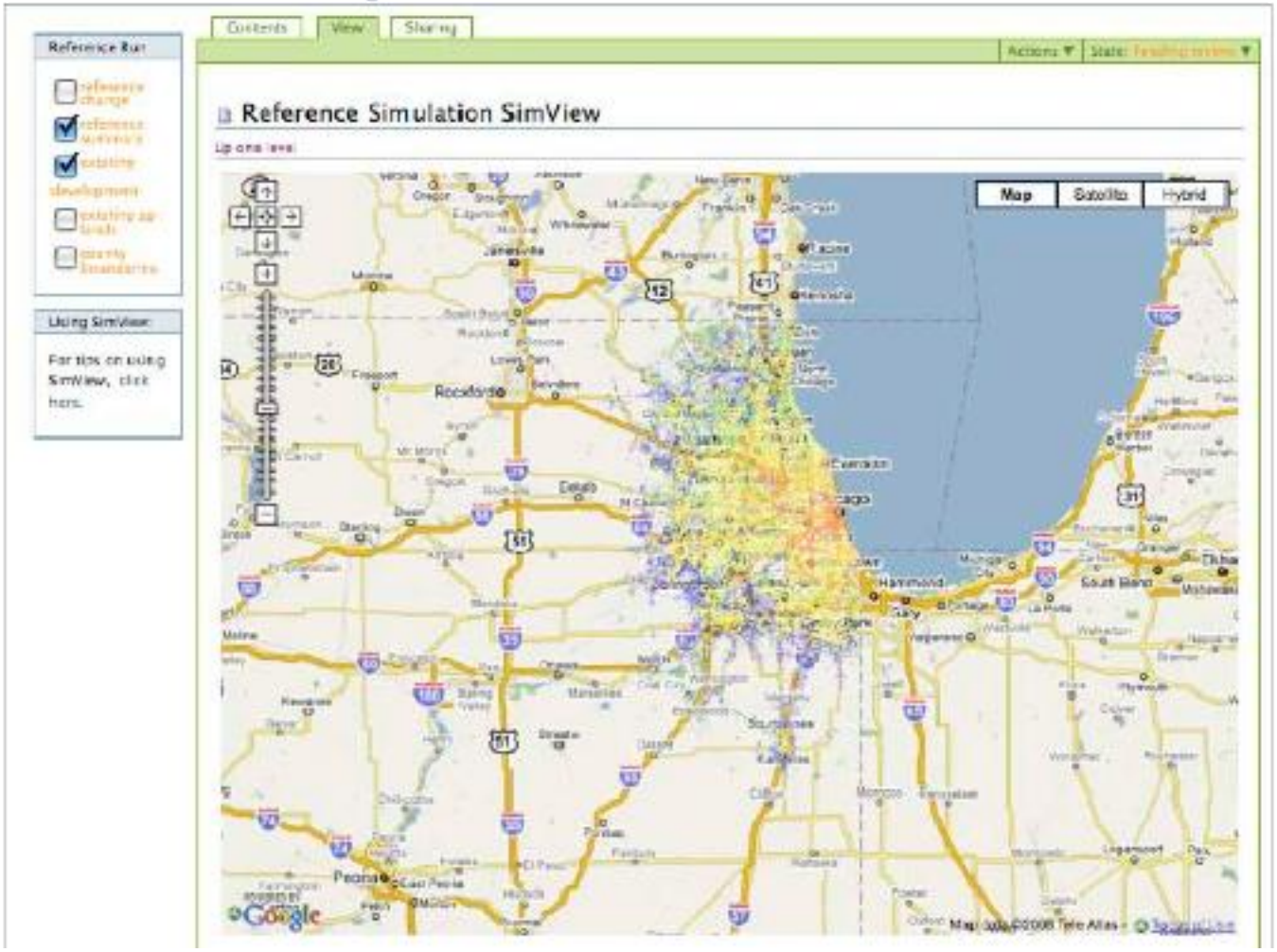
SimView



Legends are displayed to right of the selected Map

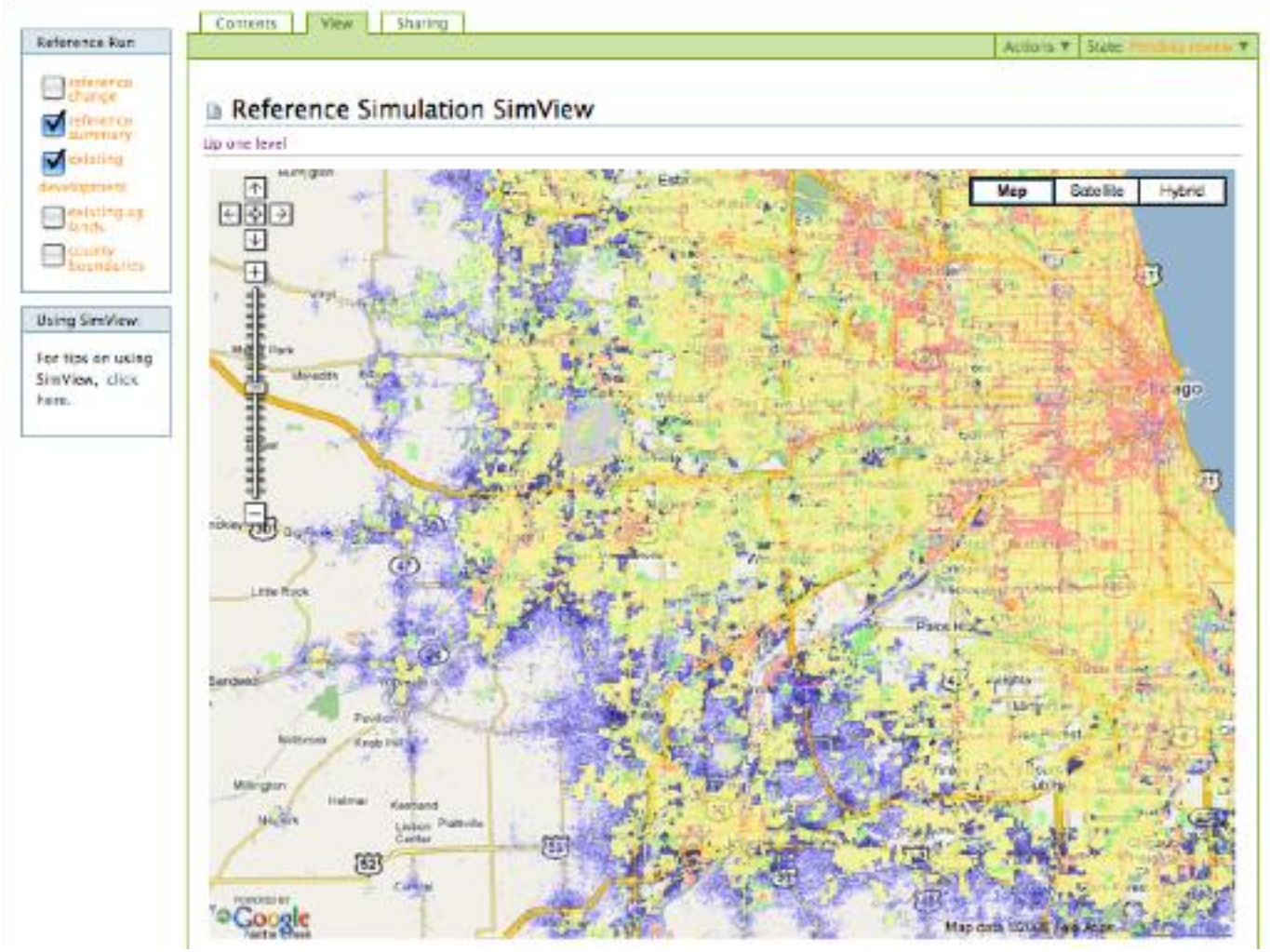
They are listed in the order Maps are selected

SimMaps



The GeoPortal has a wealth of useful information including LEAM simulation Maps describing various policy alternatives

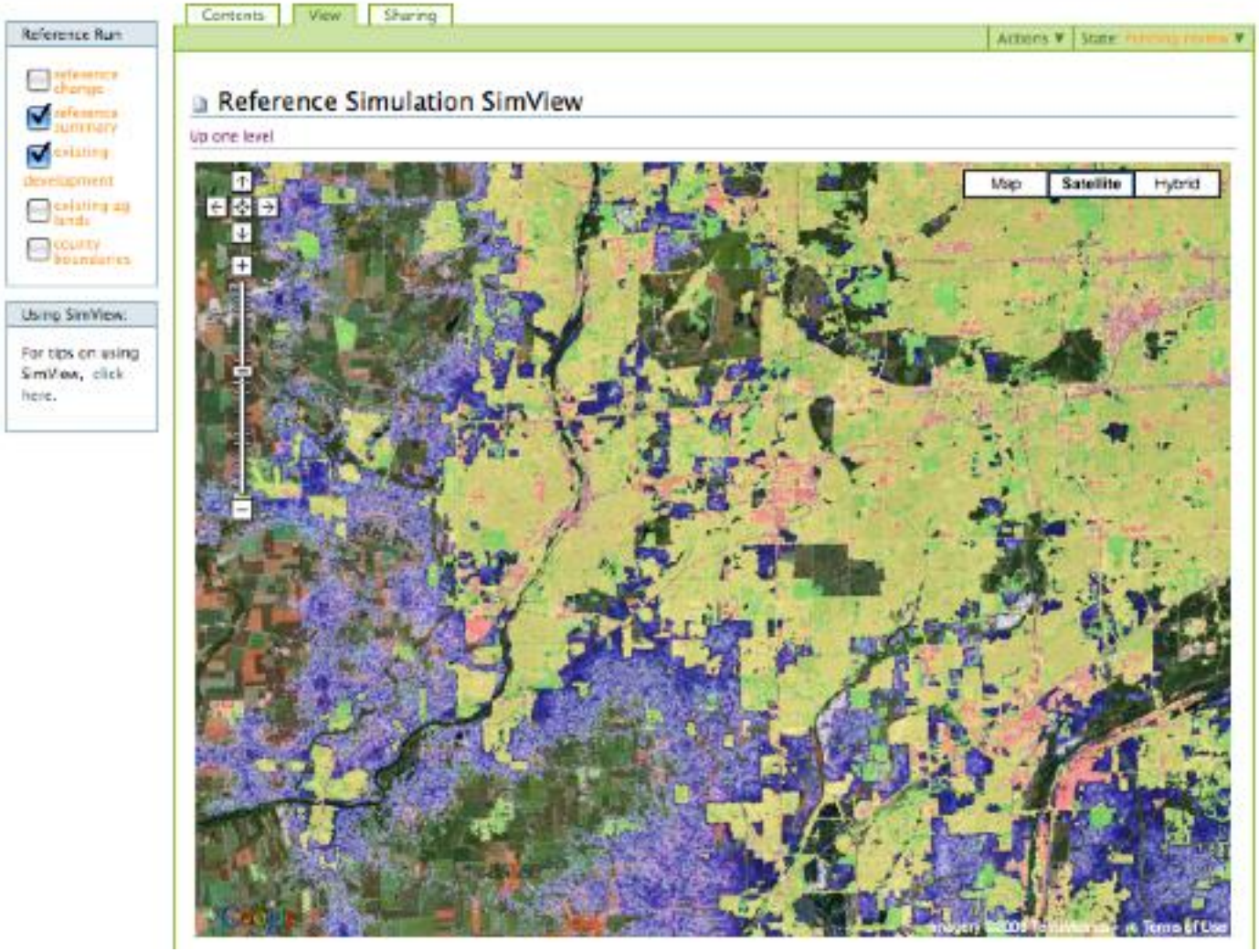
SimMaps



SimMaps can be navigated like any other GoogleMap

ZOOM!

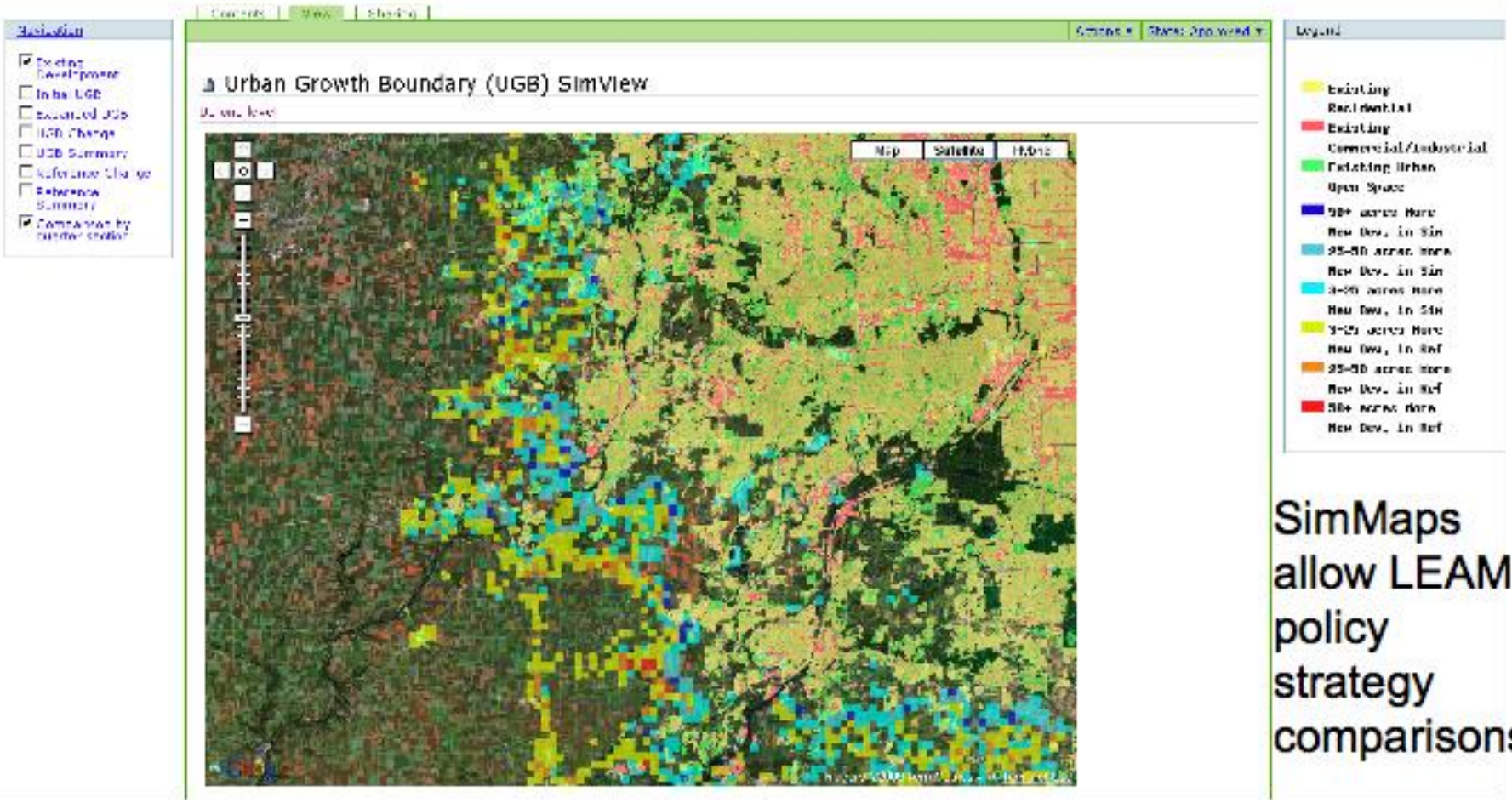
SimMaps



SimMaps can be navigated like any other GoogleMap

Satellite!

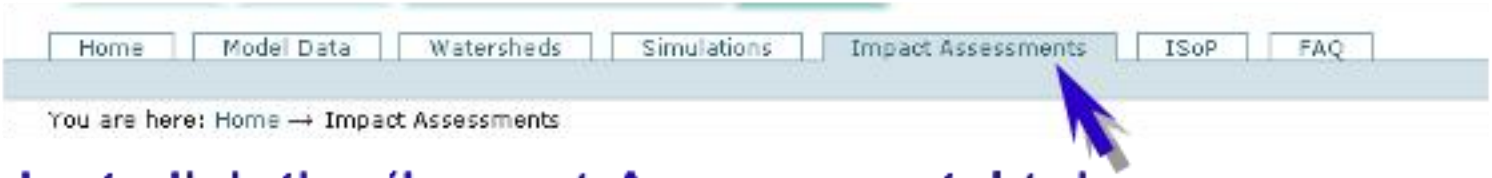
SimMaps



SimMaps allow LEAM policy strategy comparisons

Impact Analysis

The GeoPortal also contains information on the implications of policy alternatives



Just click the 'Impact Assessments' tab

Conclusions

- The GeoPortal also includes LEAM model data, presentations and reports related to the analyses conducted.
- The Chicago Region Watershed Planning Support System GeoPortal is a wealth of information at your fingertips
- Enjoy!